



George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

QD-QE-010
REVISION C

EFFECTIVE DATE: September 24, 2004

ORGANIZATIONAL INSTRUCTION

Software Assurance Software Milestone Review Support

OPR(s)

QD10,QD20,QD30,QD40

OPR DESIGNEE

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		10/13/00	
Revision	A	9/09/02	Format and numbering change to implement requirements of QD-A-001 rev F.
Revision	B	09/18/03	Changes made to incorporate new QD40 organizational name
Revision	C	09/24/04	Revised to bring document in compliance with the HQ Rules Review Action (CAITS: 04-DA01-0387). Changes were also made to reflect S&MA organizational name changes (i.e., QS to QD).

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Software Assurance (SA) Software Milestone Review Support

1.0 PURPOSE AND APPLICABILITY

1.1 Purpose - This organizational instruction defines the Software Assurance representative's roles and responsibilities in supporting program/project software milestone reviews (i.e., SRR, PDR, CDR, and TRR).

1.2 Applicability - This organizational instruction is applicable to Safety, Reliability, and Quality Assurance Policy, Assessment, and Integration Department (QD40) role in the verification of SQA's involvement in the project/program software milestone reviews.

2.0 DOCUMENTS (Applicable and/or Reference)

2.1 Applicable Documents

QD-QE-008	Software Assurance Status Report
QD-QE-009	Software Assurance Review/Approval of Technical Documents
QD-QE-012	Software Quality Assurance Support of Formal Software Testing

2.2 Reference Documents

QD-QE-011	Software Quality Assurance Software Audits
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3.0 DEFINITIONS

3.1 Software Requirements Review (SRR) - The SRR is a formal technical review of the requirements specifications of the software prior to the start of the design activity.

3.2 Preliminary Design Review (PDR) - The PDR is a formal technical review of the basic design approach of the software package. It is scheduled after the baselining of the software requirements and prior to the start of the detailed design.

3.3 Critical Design Review (CDR) - The CDR is a formal technical review of the detailed design of the software prior to the start of the coding activity.

3.4 Test Readiness Review (TRR) - The TRR is a formal technical review to determine readiness of software to begin formal testing.

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4.0 INSTRUCTIONS

4.1 Safety, Reliability, and Quality Assurance Policy, Assessment and Integration

Department's (QD40) Support – Safety, Reliability, and Quality Assurance Policy and Assessment Department's support to the project/program office regarding software requirements review (SRR) may be provided through the verification of the contractor's involvement in the requirements review or direct verification by participating in the actual review of the software requirements.

4.2 Verification of Contractor Involvement -The Software Assurance representative should use the following instructions when verifying the contractor's involvement:

4.2.1 Review the contractor's checklist for completeness. Compare with the checklist in Appendix D of QD-QE-009 as an aid in determining missing items on the contractor's checklist.

4.2.2 Review contractor's assessment of checklist items.

4.2.3 Status all open items in contractor's assessment report.

4.2.4 Review any nonconformance generated to identify procedural discrepancies.

4.2.5 Verify that the Configuration Management organization has approved/baselined the software requirements specification.

4.2.6 Document the results of the contractor's involvement in the SRR in a Software Assurance Status Report per QD-QE-008.

4.3 Direct Verification - The Software Assurance representative should use the following instructions when participating in the actual review of the software requirements:

4.3.1 Pre-SRR Activities

4.3.1.1 Ascertain the schedule of the SRR.

4.3.1.2 Interface with the project/program office.

4.3.1.3 Ensure that the SRS is the latest revision.

4.3.1.4 Review the software requirements specification per QD-QE-009.

4.3.2 SRR Activities

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4.3.2.1 Participate as a voting member in the SRR.

4.3.2.2 Assure open items identified during the SRR are documented.

4.3.2.3 All deviations/waivers are addressed and approved.

4.3.2.4 Vote to concur or non-concur with the start of the design phase based on the results of the SRR.

4.3.3 Post-SRR Activities

4.3.3.1 Document the results of the SRR in a Software Assurance Status Report per QD-QE-008.

4.4 PDR and/or CDR Software Milestone Review - A project/program PDR and/or CDR software milestone review may be conducted as a single review or as part of an overall project/program review. The Software Assurance representative's support to the project/program office during its software milestone review may be provided through the verification of contractor's involvement in the milestone review or direct verification by participating in the actual milestone review.

4.5 Verification of Contractor's Involvement - When verifying the contractor's involvement in a particular project/program software milestone review (PDR, CDR), the following instructions should be followed by the Software Assurance representative:

4.5.1 Review the contractor's checklist for completeness in accordance with the applicable software product under review. Compare contractors' checklist against the Safety, Reliability, and Quality Assurance Policy, Assessment and Integration Department (QD40) Software Quality Assurance checklists. Project/Program software milestone review checklists are provided herein as Appendix A (PDR) and Appendix B (CDR).

4.5.2 Review the assessment performed by the contractor's SA personnel for each item on the checklist.

4.5.3 Determine status of all open items in the assessment report.

4.5.4 Assess and review the status of each documentation issue written by the contractor's SA personnel.

4.5.5 Review any non-conformances reports generated to identify procedural violations. Determine the status of each nonconformances and review responses from violators.

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4.5.6 Review non-conformances/discrepancies with the contractor SA management and establish a plan for resolution of those non-conformances/discrepancies.

4.5.7 Conduct follow-up meetings with the contractor SQA management to verify that the reported nonconformances/discrepancies have been resolved and closed.

4.5.8 Document the results of the milestone review in a Software Assurance Status Report per QD-QE-008.

4.6 Safety, Reliability, and Quality Assurance Policy, Assessment and Integration Department (QD40) Software Quality Assurance Involvement - In the direct verification for the project/program office, the planning and execution of the assessment shall be performed by the assigned Software Assurance representative using the following instructions for each software milestone review:

4.6.1 Acquire the schedule for the review details for the forthcoming review.

4.6.2 Establish all necessary interfaces with the project/program.

4.6.3 Tailor checklists (contained herein) to reflect contractual requirements.

4.6.4 Evaluate the design review using tailored checklists.

4.6.5 Coordinate SA activities with supporting S&MA organizations.

4.6.6 Prepare documentation issues for each nonconformance/discrepancy identified.

4.6.7 Attend nonconformance/discrepancy review meetings and address safety, reliability, and quality assurance concerns.

4.6.8 Ensure that the design and associated documentation are updated to reflect the results of the nonconformance/discrepancy review meetings.

4.6.9 Document the results of the milestone review in a Software Assurance Status Report per QD-QE-008.

4.7 Test Readiness Review (TRR) - A successful Test Readiness Review (TRR) should accomplish the following:

4.7.1 Assurance that the scheduled test activity can be successfully and safely achieved with minimal risk to test subjects, test personnel, test article, or test system/facility.

4.7.2 Verification that all issues/constraints are identified and addressed.

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4.7.3 Statement of test readiness endorsement by TRR members which provides authorization to commence with the planned test or training activities, contingent upon resolution of test constraints identified in the TRR.

4.8 Pre-TRR Activities:

4.8.1 Review TRR agenda.

4.8.2 Review test documentation in accordance with QD-QE-009, as required.

4.8.3 Verify configuration under test is compatible with requirement documents. If under baseline, ensure that any approved changes have not invalidated the baseline configuration.

4.8.4 Any open waivers, and/or unimplemented configuration changes are reviewed for impact to the planned activity.

4.8.5 Verify all activities as specified in Program requirements and Software Development Plan to ensure software is ready for formal testing.

4.8.6 Quality concerns, constraints, open items that need to be waived for testing should be prepared for presentation.

4.8.7 Review presentation with Safety, Reliability, and Quality Assurance Policy, Assessment and Integration Department (QD40) management.

4.9 TRR Activities:

4.9.1 Present and discuss Quality concerns, constraints, open items and assure any additional items identified during the TRR are documented.

4.9.1.1 Ensure all open deviations/waivers are addressed and approved.

4.9.2 Vote to concur or non-concur the start of the test activity, based on the results of the TRR preparation.

4.10 Post-TRR Activities:

4.10.1 When the readiness of a test cannot be attested to by the TRR members, the Software Assurance representative shall perform the following:

4.10.1.1 Follow-up on any assigned action items.

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4.10.1.2 Coordinate with other assignees to assure all open items are closed or worked to acceptable conclusion prior to authorized test start.

4.10.1.3 Upon resolution of open items, attest to the readiness to begin the planned testing.

4.10.2 Document the results of the TRR activities in a Software Assurance Status Report per QD-QE-008. Participate in the testing according to QD-QE-012.

5.0 NOTES

None

6.0 SAFETY PRECAUTIONS AND WARNING NOTES

None

7.0 APPENDICES, DATA, REPORTS, AND FORMS

APPENDIX A – Preliminary Design Review Checklist

APPENDIX B – Critical Design Review Checklist

8.0 RECORDS

None

9.0 TOOLS, EQUIPMENT, AND MATERIALS

None

10.0 PERSONNEL TRAINING AND CERTIFICATION

None

11.0 FLOW DIAGRAM

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None

12.0 RESPONSIBILITIES

Work accomplished within the scope of this organizational instruction will performed by the Software Assurance representative. The Safety, Reliability, and Quality Assurance Policy and Assessment Department (QD40) may delegate the responsibilities and tasks provided in this organizational instruction to support contractors who are responsible for carrying out the tasks identified herein.

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Appendix A – Preliminary Design Review Checklist

Item	Criteria	Assessment	Comments
1.	Was the PDR review package sent out in time to allow for preparation for the review?		
2.	Were the technical personnel prepared for the review?		
3.	Have all issues with the requirements baseline been resolved?		
4.	Are the requirements specifications complete?		
5.	Does the requirements specification reflect authorized changes to the baseline?		
6.	Are all external interfaces defined?		
7.	Was the complete top-level design presented at the PDR?		
8.	Are all functional/performance requirements accounted for in the top-level design?		
9.	Have external interface designs been reviewed and agreed to among all parties involved with the interface?		
10.	Has compatibility between top-level design and the external interfaces been established?		
11.	Has internal design compatibility been established?		
12.	Have all authorized changes to requirements been accounted for in the design?		
13.	Have all components, data structures, and data flows been identified and defined?		
14.	Did the software engineers conduct an implementation feasibility study?		
15.	Has a risk analysis been performed?		
16.	Has a risk analysis identified any mechanisms to eliminate or control?		
17.	Was there any design tradeoff studies performed and presented at PDR?		
18.	Has all software related scenarios been analyzed to determine impact on safety functions?		
19.	Have software tools been included in the safety analysis?		
20.	Have reliability requirements in the SRS been allocated into the software design?		
21.	Was an overview of the data structure presented?		
22.	Are the computer security requirements accounted for in the design?		
23.	Have there been any erroneous or incomplete requirements identified?		

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Appendix A (continued) – Preliminary Design Review Checklist

Item	Criteria	Assessment	Comments
24.	Was there any design methodology specified in the requirements, was it reflect in the top-level design?		
25.	Has it been determined whether the timing and sizing constraints were met throughout the top-level design?		
26.	Are there any plans to use development tools that are not deliverable under the terms of the contract?		
27.	Are there any plans to certify for use non-deliverable development tools?		
28.	Was any commercially available software identified? Adequate documentation provided?		
29.	Was all required design standards reflected in the design?		
30.	Were all PDR requirements satisfied?		
31.	Were there any design deficiencies identified?		
32.	Were all applicable SQA activities identified in the SQAP/procedures performed during the top-level phase?		

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Appendix B – Critical Design Review Checklist

Item	Criteria	Assessment	Comments
1.	Were the CDR materials sent out in sufficient time to allow for preparation for the review?		
2.	Were the CDR materials complete, in order to allow for the CDR to be held?		
3.	Are all action items from the PDR closed?		
4.	Are the authorized changes to the software requirements reflected in the detailed design?		
5.	Can the allocated requirements be accounted for in the detailed design?		
6.	Were the design tradeoffs performed and the results presented at CDR?		
7.	Was there a technical risk analysis conducted and the results presented at CDR?		
8.	Has the requirements specification been updated to reflect approved changes?		
9.	Were all interfaces identified and defined for the software element addressed at CDR?		
10.	Were data flow charts complete and traceable to the preliminary design?		
11.	Were the detailed design characteristics of the data base presented?		
12.	Were there any deficiencies identified?		
13.	Were the required design standards/constraints reflected in the design?		
14.	Was the CDR conducted in accordance with the design review procedures?		
15.	Is the detailed design compatible with the design presented at PDR?		
16.	Was the appropriate security requirements addressed?		
17.	Was the design presented in detail to allow approval?		

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Appendix C – Test Readiness Review Checklist

Item	Criteria	Assessment	Comments
1.	Were the TRR materials sent out in sufficient time to allow for preparation for the review?		
2.	Were the TRR materials complete, in order to allow for the CDR to be held?		
3.	Are all action items from previous milestone reviews closed?		
4.	Are the authorized changes to the software requirements reflected in the test traceability matrix?		
5.	Has the requirements specification been updated to reflect approved changes?		
6.	Were all interfaces identified and defined for the software element addressed at TRR?		
7.	Have test procedures been approved and dryrun?		
8.	Was a status of all Software Change Requests (SCRs) presented?		
9.	Was the TRR conducted in accordance with the TRR procedures?		